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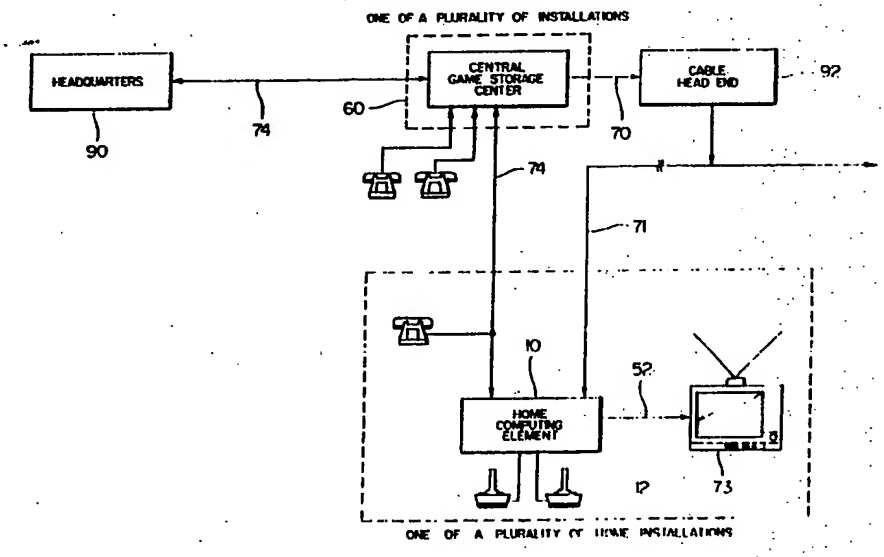

(57) Abstract

A digital, interactive communication system designed to provide a plurality of remote subscribers with any one of a plurality of stored video games or like software packages through the use of a home computing assembly (10) maintained within the subscriber's home and structured to display video as well as generating audio on a standard television receiver (73) and further incorporating the ability to utilize contemporary video gaming control devices (12) for subscriber program interaction. A bidirectional communication link (74) is established over the telephone lines between the home computing assembly (10) and the central remote game storage center (60) wherein the software programs are transmitted as a modulated carrier to the subscriber. Program selection is controlled by a remote game storage center executive software program. Automatic billing is performed by computing equipment maintained in the remote game storage center and transmitted to a headquarters (90) which also receives diagnostic messages associated with the remote game center and/or the associated plurality of home computing elements.

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TELEPHONE ACCESS VIDEO GAME DISTRIBUTION CENTER

BACKGROUND OF THE INVENTION

This invention relates to a home computing element capable of establishing a digital, interactive communications system providing a plurality of subscribers access to a plurality of video games stored in a plurality of remote game storage centers. It also provides for the use of a standard television receiver for video and audio, and contemporary input devices to interact with the software program, including video games. A bi-directional telephone link is established between the home computing element and a remote game storage center to access the desired game, and a television broadcast channel used uni-directionally to transmit the game software programs.

Much is known about video gaming devices for the home. Presently, all require non-volatile game cartridges to store the game software programs, and use known color graphics circuits along with synthesized audio techniques. GAme cartridges are relatively expensive to purchase, and once they are used for some time, they are used rarely thereafter. This has led to the proliferation of video game rental outlets as individuals express that they would rather have variety than ownership, and would also rather make a shorter and less expensive commitment.

Prior art patents representing known communication or subscriber systems are represented in the U.S. Patent 4,829,372 to McCalley wherein a digital, interactive communication system is accessible to a plurality of subscribers who can select any of a plurality of pre-recorded video/audio presentations for viewing on a conventional

television set. The system includes a converter tuned to a channel for monitoring a digital stream of information including digital packets representative of video/audio presentations selected by the individual subscribers. A subscriber is housed within the apparatus supplied the individual subscriber and the subscriber server receiving uniquely addressed digital packets converts the received packets into NTSC-compatible analog formatted video/audio presentation for transmission to the requesting subscriber.

In addition, Abraham, 4,567,512 and 4,590,516, discloses a system controlled through conventional telephone networking in conjunction with a home controller that contains a micro-processor and incorporating a telephone interface which allows a subscriber to request a given program which is available on a pre-scheduled time basis. Abraham does not disclose digital transmissions. In addition, Abraham discloses in U.S. Patent 4,521,806 signal traffic paths being established for telephone communication and cable program transmission in a basic subscription broadcast system. The program material is stored at a library broadcast station in analog form and is digitized and time compressed after readout for transmission to the subscribers along the cable paths.

Other patents demonstrating the prior art of the same subject matter include Pocock et al., 4,734,764; Clark et al., 4,761,684; and Gordon, 4,763,191.

In addition to the above, the U.S. Patent to Harrison, 4,584,603, discloses an amusement and information system for use in a closed environment such as on airlines wherein an entertainment terminal including a keyboard and video display assembly is available for use by the occupant and is

structured to provide access to video games as well as movies and other selected information.

Although it is well known to use a bi-directional telephone link, as evidenced by the above-noted patents, to access audio and video information hat is transmitted as a related but independent television broadcast channel, it is apparent that a need exists for the transmission of executable computer software program code representing video games using a television broadcast channel to reach a plurality of subscribers and act upon individual requests.

It is an object of this invention to provide a vehicle whereby a plurality of video game software programs are made available substantially upon demand and upon request to individual subscribers on a "pay-per-play" basis with a minimum of subscriber overhead. Another object is to provide a home computing element that provides the means to utilize said software programs, including video games, from within the residence and under subscriber control using contemporary game control devices.

Summary of the Invention

In accordance with the system of the present invention, any of a plurality of individual subscribers may request a video game stored in a software program library at a remote location utilizing a home computing element or assembly to establish a bi-directional telephone communication link with a remote game storage center to access the services offered. The remote game storage center acknowledges the request and establishes a bi-directional channel of communications. The home computing element transmits a unique identification code, the game select code, the existence of a previously

loaded game software program and any mode commands. During this time, the display on the home computing element shows the status of the operation in progress. If the homecomputing element cannot establish communications with the remote game storage center, it will retry several times before dropping the line and indicating a failed communication attempt to the subscriber.

While maintaining communications with the home computing element, the remote game storage center logs the time, telephone number, identification code, the operating mode and the desired game selection of the requesting home computing element. If the selected game is already resident in the home computing element, the remote game storage center transmits an authorization code to the home computing element effectively enabling the software program, and drops the telephone line. A game software program is not transmitted in this case, but if the selection is not in the home computing element memory, the remote game storage center transmits the encoded video game software program and the home computing element identification code as a digital bit stream of information over a television broadcast channel. The telephone line is maintained active until all tasks have been completed.

The home computing element requesting the game may receive the video game software program only after identification code validation occurs. This prevents unauthorized use by others. Once reception of all the software data has been successfully completed, the home computing element acknowledges receipt to the remote game storage center and drops the telephone line. The encoded software program is decoded and is enabled to be used. The

subscriber is told through the display that the game is ready for use. All of these actions occur in a very short period of time.

The home computing element offers the subscriber the means to interact with the game using contemporary gaming control or input devices. The game may be played as many times as desired. Each time the subscriber restarts the game, a telephone link is established with the remote game storage center for billing and authorization for use before the game may be used. The software program remains in memory until either power is removed or a new software program is loaded. Even though a program may be resident within the home computing element, its use is restricted unless authorization is issued by the remote game storage center. The remote game storage center always maintains an activity log for each subscriber which is used for billing.

Brief Description of the Drawings

For a fuller understanding of the nature of the present invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

Figure 1 is a system level block diagram depicting a digital interactive communication system in conjunction with a home computing assembly of the present invention.

Figure 2 is a front view of one preferred embodiment of the home computing assembly as represented in block diagram in Figure 1.

Figure 3 is a detailed functional block diagram of the home computing assembly shown in Figure 2.

Figure 4 is a functional block diagram of one embodiment of a remote game storage center of the present invention.

Figure 5 is a flow chart depicting the operational logic encompassing the remote game storage center of Figure 4.

Figure 6 is a flow chart that relates the tasks performed by a home computing assembly executive program.

Figure 7 is a flow chart showing the functional aspects of a command processor defined as part of the home computing assembly shown in Figure 2.

Figure 8 is a flow chart of the dial-up routine "DIAL" which is invoked by the command processor whose flow chart is shown in Figure 7.

Figure 9 is a continuation of the flow chart shown in Figure 8.

Figure 10 is a flow chart of the functions performed by the game storage card programming routine "PROG" which is invoked by the command processor whose flow chart is shown in Figure 7.

Figure 11 is a flow chart of the reset game routine "RST" which is invoked by the command processor whose flow chart is shown in Figure 7.

Figure 12 is a flow chart of the start game routine "STRT" which is invoked by the command processor whose flow chart is shown in Figure 7.

Description of the Preferred Embodiment

Referring to Figure 1, the preferred embodiment of the present invention comprises a system including a plurality of remote game storage centers 60 which communicate with a plurality of subscriber locations indicated as such. Each of the subscriber locations includes a home computing assembly or element 10, a standard television receiver 23 and one or more gaming control devices 12. A digital interactive

communications environment is established using a plurality of voice quality telephone lines 74 and a television broadcast facility 92 such as a CATV network, defined in Figure 1 as cable head end which is lined to the home subscriber facility and more particularly, the home computing element as at 71. It should be noted that the telephone lines 74 connect directly the remote game storage center 60 with the home computing element 10 and also connect the remote game storage center with a headquarters 90, to be described in greater detail hereinafter.

The subscriber utilizes the home computing element 10 to call the remote game storage center 60 through the telephone line 74. Once the link is established, the subscriber may select any one of a plurality of pre-stored video games or like software programs previously provided to the subscriber by any type of pre-available menu. The selection is made by pressing the appropriate keys as at 24 on the home computing element 10 as set forth in greater detail in Figure 2. The software program representing the selected video game is retrieved from a permanent storage library by a computer facility at the remote game storage center 60 and transmitted typically to a CATV head 92 as an encoded stream of digital data in NTSC compatible format as at 70. The signal is then broadcast through the CATV network along with pre-recorded video programming to all cable subscribers. All cable subscribers may view the pre-recorded video programming portion. However, only the specifically requesting subscriber locations or home installations containing the requesting home computing element 10 can receive, decode and use the video game software programs which have been selected.

The RF video signal is received from the distribution cable 71, is processed and the resulting, decoded software program stored by the HCE 10 and is then enabled for use by the subscriber in conjunction with display at the conventional television receiver 73. The desired gaming control facilities as at 12 are also usable for subscriber interaction with the video game software program.

All billing for use of the subscribed video games is performed automatically by the computer facilities of the remote game storage center 60 and the information is transmitted over the telephone lines 74 to the main office or headquarters 90 (see Fig. 1). The headquarters 90 may also request other specific information such as but not limited to diagnostic test results from the remote game storage center 60 and may send commands and/or software programs that may be executed by the computer facilities maintained within the remote game storage center 60.

Again with reference to Figure 2, a preferred embodiment of the home computing element or assembly 10 encompasses an alphanumeric display 13 to demonstrate or display messages. In addition, a keyboard for subscriber interaction, for example, to enter game selection and commands are represented and includes numerical keys collectively referred to as 24. In addition, commands may be entered into the system by use and considered a part of the home computing element 10.

In operation, the subscriber first uses the numeric keypad 15 further utilizing any of the numerical keys to enter the code number for the video game programs selected off the aforementioned published menu previously provided. The clear key 16 is used to correct any data entry errors. Once the entire number is entered the enter key 17 is pressed

and the home computing element 10 responds by displaying the selections on the display 13. The dial key 18 is then pressed to call the remote game storage center 60 and transmit the proper home computing element 10 identification code and game selection number one by virtue of telephone line 74. The game software program is received by the home computing element 10 where it is decoded and stored. The display 13 indicates that a game is loaded and ready for play. The game is started by pressing the start key 23 and paused at any time by pressing the appropriate pause key 22. Pressing this key again serves to restart the game. The TV/game key 21 may be pressed to switch to view standard programming on the television receiver 73 overriding the game display and audio.

The video game software program may be permanently stored in a removable, non-volatile memory card 25 by ensuring that a card is placed in the side slot as appears in Figure 2. A one time purchase charge will be billed, but the game may be played as often as subscriber likes using the card 25 without incurring additional costs.

Referring to Figures 5 through 12; Figure 5 demonstrates a flow chart depicting the operational logic encompassing the remote game storage center. Figure 6 is a flow chart demonstrating the task performed by an executive program encompassed within the home computing element 10.

Figure 7 is a flow chart showing the functional aspects of a command processor defining a portion of the home computing element 10 shown in detail in Figure 2. Figure 8 and Figure 9 is a flow chart of a dial-up routine (DIAL) which is invoked by the command processor (Fig. 7) of the home computing element 10.

Figure 10 is a flow chart demonstrating the functions performed by the game storage card 25 programming routine (PROG) which is invoked by the command processor (Fig. 7) of the home computing element of Figure 2. Figure 11 is a flow chart of a reset game routine (RST) which is invoked by the command processor whose flow chart is shown in Figure 7.

Figure 12 is a flow chart demonstrating the start game routine (STRT) invoked by the command processor (Fig. 7) of the home computing element 10.

Figure 3 is a detailed, internal block diagram which shows all of the major circuits contained in the home computing element 10. The home computing element 10 is based on a micro-processing unit 30 which acts as the overall controller. The micro-computer 30 operates as dictated by the executive program which is stored in the ROM 31. The flow charts as set forth in Figures 5 through 12 and as explained in greater detail above illustrate the operations related to the executive program in more specific detail. Data areas required by the executive and external program areas reserved for the use of downloaded video game software programs reside in random access memory (RAM) 32. The memory areas in RAM are volatile and will lose their contents if power is removed, therefore, an electrically erasable programmable read only memory (EEPROM) 33 provides non-volatile storage for such data as the telephone number of the remote game storage center 60 serving the subscriber, the home computing element 10 identification code, and other information that must be retained if power is lost.

As shown in Figure 3, several circuits are provided to interface the micro-controller or micro-processor unit 30 to the outside world referred to herein as peripheral devices.

A telephone link is provided by a universal asynchronous receiver/transmitter (UART) 34 whose digital output keys two distinct audio tones that are transmitted to the telephone line, along with "hand-shaking" information by a modem interface 35. The modulated outputs are transformer coupled to the telephone line 79. All telephone communications, including automatic dial-up are handled by the micro-processing unit 30 utilizing this circuitry.

The keyboard 42 status is read by the micro-processing unit 30 through a peripheral interface adapter 40 which is capable of interfacing with digital inputs and outputs only. A contact based game control adapter is interfaced to the micro-processing unit 30 through the peripheral interface adapter 40, but potentiometer based input devices, such as some joy-sticks and trackballs, are interfaced through an analog to digital converter (ADC) 39 which is capable of converting the analog signals provided by the input device to their numeric or binary representations required by the micro-processing unit 30. The display module 13 (see also Figure 2) containing the internal electronics necessary to display alpha/numeric characters, interfaces directly to the micro-processing unit 30 data bus 50. The display is where all the system status messages are displayed to the subscriber.

Again with reference to Figure 3, the incoming broadcast channel 51 is monitored for game software programs. The signal is demodulated by an RF demodulator 36 and then passed to a digital signal processor 37 which samples the signal, converts it to digital data, processes the information and then makes it available to the micro-processing unit 30. The digital signal processor 37 is a single-chip computer

tailored to the task of obtaining a digital representation of analog signals and digital processing at a very fast rate; currently up to 33 million operations per second. The digital signal processor 37 acts as a co-processor operating under the control of its own custom software program written in a machine specific computer language.

The NTSC compatible signal 52 that is ultimately connected to the television receiver 73 contains all of the video and audio information associated with the game. the video is generated by the graphics generator circuit 45 which is itself another co-processor, while the sound generator 44 creates all of the audio and is directly controlled by the micro-processing unit 30. The output signals are used to modulate carriers with the video 47 and audio 46 modulators and then mixed with a RF combiner 48 whose output is a NTSC compatible television signal 52 that drives the television receiver 73. The TV/GAME relay 49 is controlled by the micro-processing unit 30 and connects the output of the combiner 52 to the video output jack. The relay 49 responds to the activity of the TV/GAME key 21 as an alternate action device.

With reference to Figure 4, the remote game stored center 60 (Fig. 1) includes a thirty-two bit desk top computer 61 to perform all required processing, storage and control functions. Storage for the dedicated and game software is provided by a hard disk 63 with fast access times. The computer 61 is initially loaded from the magnetic tape cartridge drive 64 by a utility invoked from the 1.44 megabyte floppy drive 62 containing the appropriate disk. The utility reads the software programs from the tape drive 64 and stores it on the hard disk 63 for fast, random access

of files. The flow chart illustrating the major tasks performed by the executive program of the remote game stored center 60 is shown in Figure 5.

The computer 61 is also responsible for controlling telephone access to resident services. A plurality of telephone lines 79 are routed by a telephone switching controller 67 to several modems 66 which convert the FSK telephone signals 80 to RS-232 digital, serial data 81. This data is read and buffered by a RS-232 multiplexer/buffer 65 which allows high speed data transfers through a parallel interface 87 to serve a large plurality of modems 66. These are all bi-directional data paths allowing the computer 61 to receive and transmit data through the telephone. The computer 61 responds to different messages from the subscriber and other messages from the main office or headquarters dealing with game selections to be broadcast, types of service being provided, diagnostic test results, and billing information and other relevant information requests or command messages.

The last major task performed by the remote game storage center 60, computer 61 is the transmission of the game software programs that will ultimately execute in a home computing element 10. The software is output by the computer 61 as a digital bit stream 85 which is modulated and mixed with the signal coming from the video cassette recorder/player (VCR) 68, or other broadcast source by an RF modulator 69. The resulting output 70 is then typically delivered to a CATV head end 92 for distribution. The VCR 68 contains standard pre-recorded programming for broadcast, and is controlled by the computer 61 through a series of control lines 83.

It is therefore to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention which as a matter of language, might be said to fall therebetween.

Now that the invention has been described,

What is claimed is:

1. A bi-directional, interactive communications system for transmitting in a digital format, software programs including video games from a remote storage center to a plurality of subscriber locations on demand, said system comprising:

a) a home computing assembly disposed at each subscriber location and connected by telephone lines to the remote storage center and linked to a television broadcast facility,

b) each of said home computer assemblies structured to receive individually addressed data from the remote storage center and including decoder means tuned to a television broadcast channel for monitoring the digital streams of data representing the computer software programs and means for detecting the proper identification codes of said requesting subscribers,

c) each of said home computer assemblies including digital processing means for receiving the digital streams of data to be executed as software programs by the requesting ones of said home computing elements, and means for subscriber identification, and

d) each of said home computer assemblies further including distributed computer processing means for invoking the software programs to perform the task associated with said software programs and means to interact with said software programs.

2. A system as in Claim 1 wherein each of said home computing assemblies are defined as a remote slave computers within a wide area network and includes means of transferring software programs through a television broadcast channel.

3. A system as in Claim 1 wherein each home computing assembly is tuned to a television broadcast channel and includes means for detecting, receiving, decoding, formatting, storing and executing software programs from the television broadcast channel.

4. A system as in Claim 1 further comprising a standard television receiver and a game control assembly located at each subscriber location and each being connected to a corresponding home processing assembly, the software program being loaded from the television broadcast channel thereby eliminating the need for ancillary, non-volatile game storage devices.

5. A system as in Claim 1 wherein each of said home computing assemblies are structured to accomplish independent control of the television video and audio locally at the subscriber location, whereby control of video and audio signals is not accomplished at the originating television broadcast facility.

6. A system as in Claim 1 wherein each of said home computing assemblies include a memory programmer means for permanently recording the software program resident in RAM memory on a non-volatile game storage device such as a programmable memory medium for re-use.

7. A system as in Claim 1 wherein said remote storage center comprises a self-test diagnostic capability means for allowing access to a fault history map used to isolate malfunctions of system, components, telephone links or television broadcast channels, on demand.

8. A system as in Claim 1 further comprising an adaptive billing sub-system being computer based and capable of tracking subscriber activity.

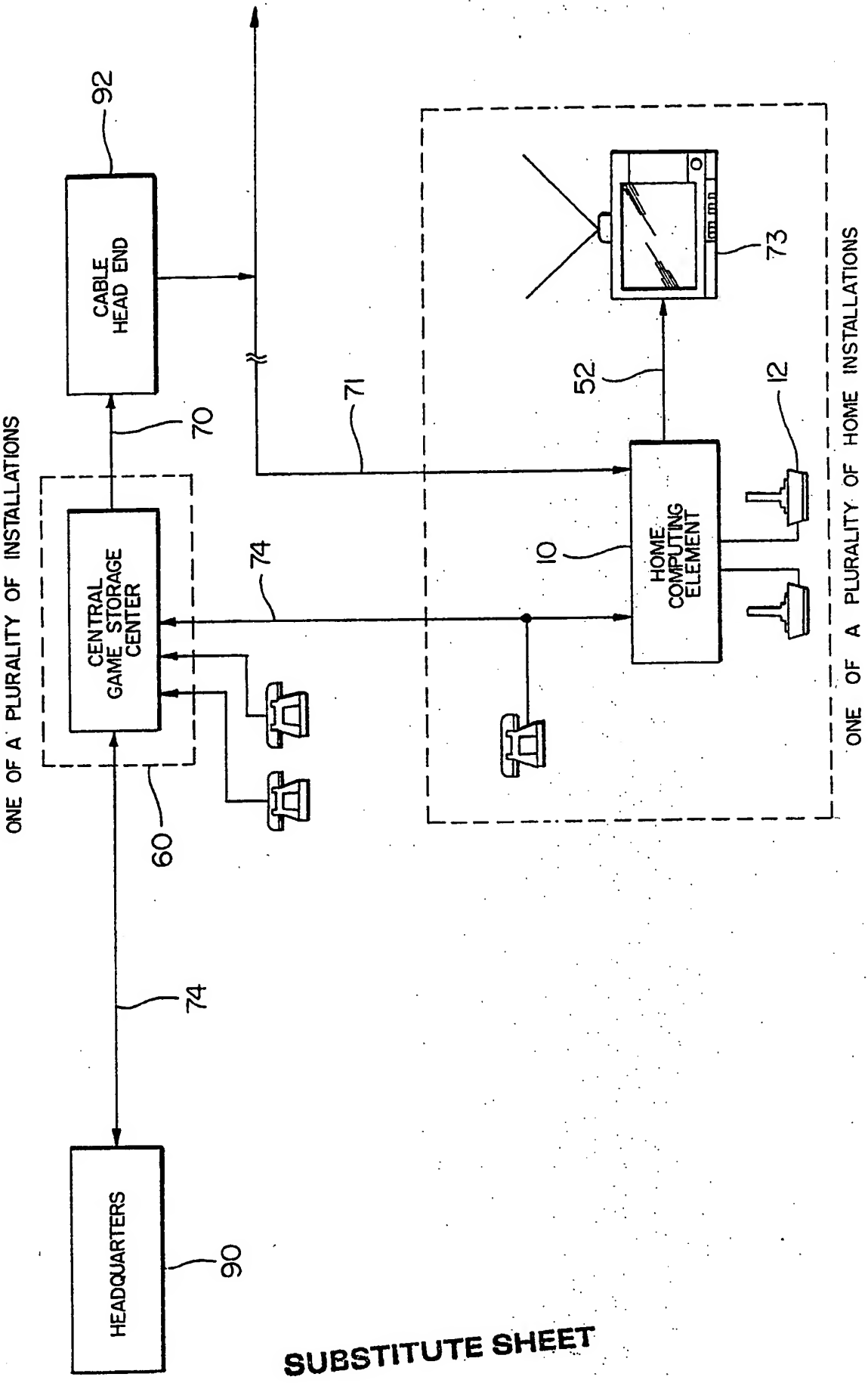
92
CABLE HEAD END
70
71
73
52
12
HOME COMPUTING ELEMENT
10
74
CENTRAL GAME STORAGE CENTER
ONE OF A PLURALITY OF INSTALLATIONS
60
ONE OF A PLURALITY OF HOME INSTALLATIONS
74
HEADQUARTERS
90

FIG. 1

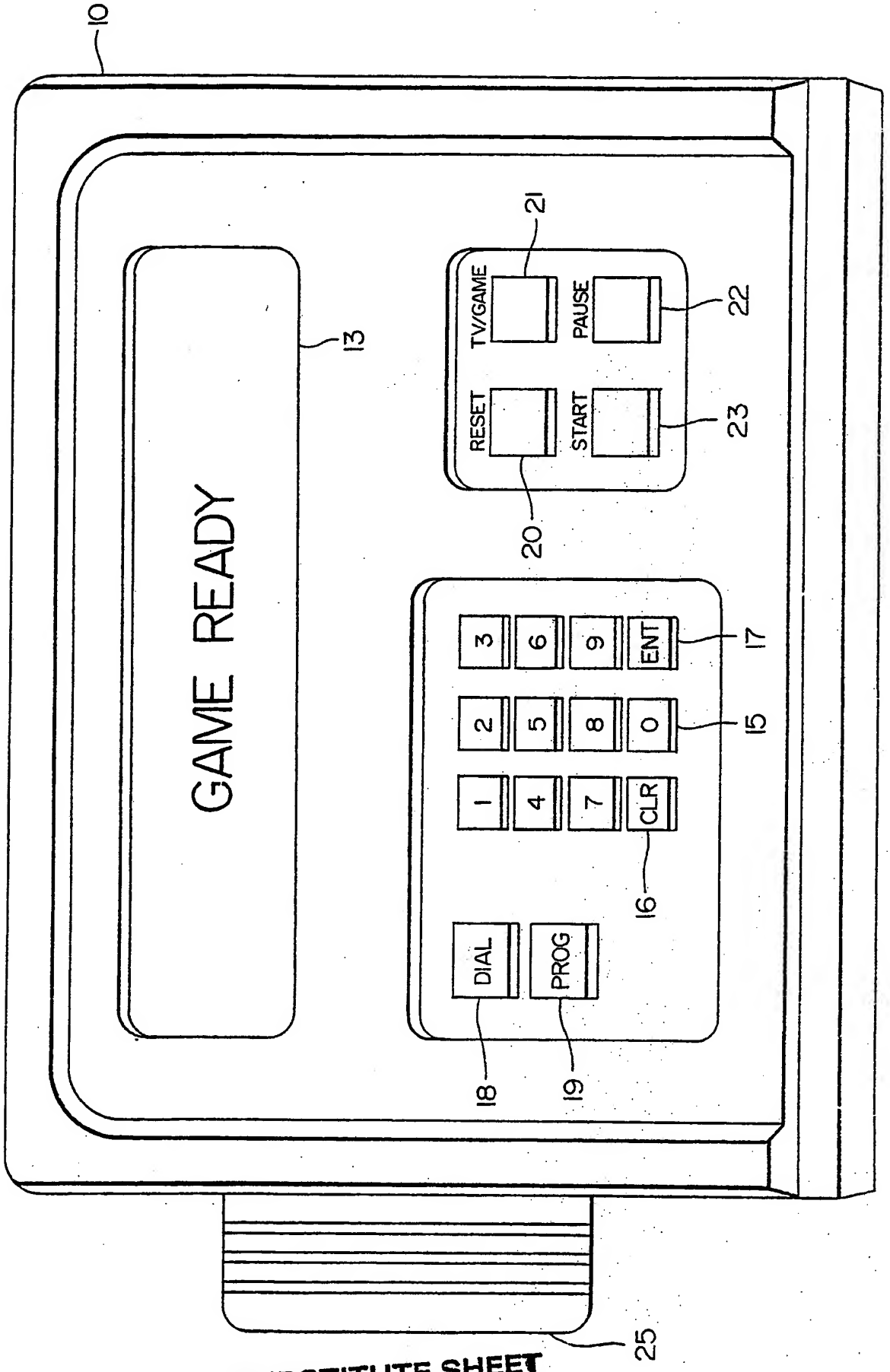
10
GAME READY
13
21
TV/GAME
PAUSE
22
RESET
START
23
20
3
6
9
ENT
17
2
5
8
0
15
1
4
7
CLR
16
DIAL
PROG
18
19
25

FIG. 2

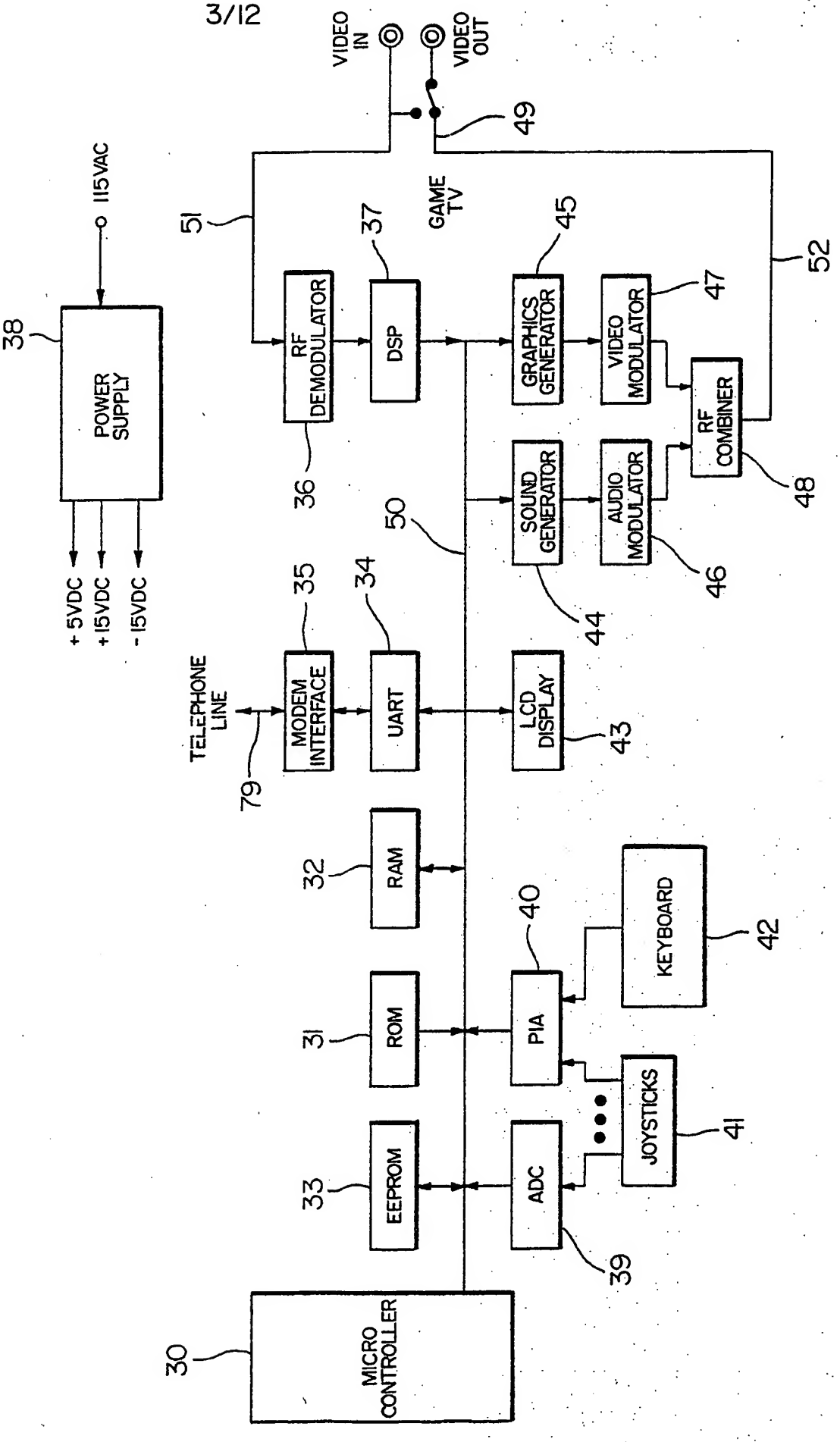
VIDEO IN
VIDEO OUT
49
115VAC
38
POWER SUPPLY
+5VDC
+15VDC
-15VDC
51
GAME TV
52
RF DEMODULATOR
36
37
DSP
GRAPHICS GENERATOR
45
VIDEO MODULATOR
47
RF COMBINER
48
SOUND GENERATOR
44
AUDIO MODULATOR
46
50
TELEPHONE LINE
79
MODEM INTERFACE
35
UART
34
LCD DISPLAY
43
RAM
32
ROM
31
EEPROM
33
PIA
40
KEYBOARD
42
ADC
39
JOYSTICKS
41
MICRO CONTROLLER
30

FIG. 3

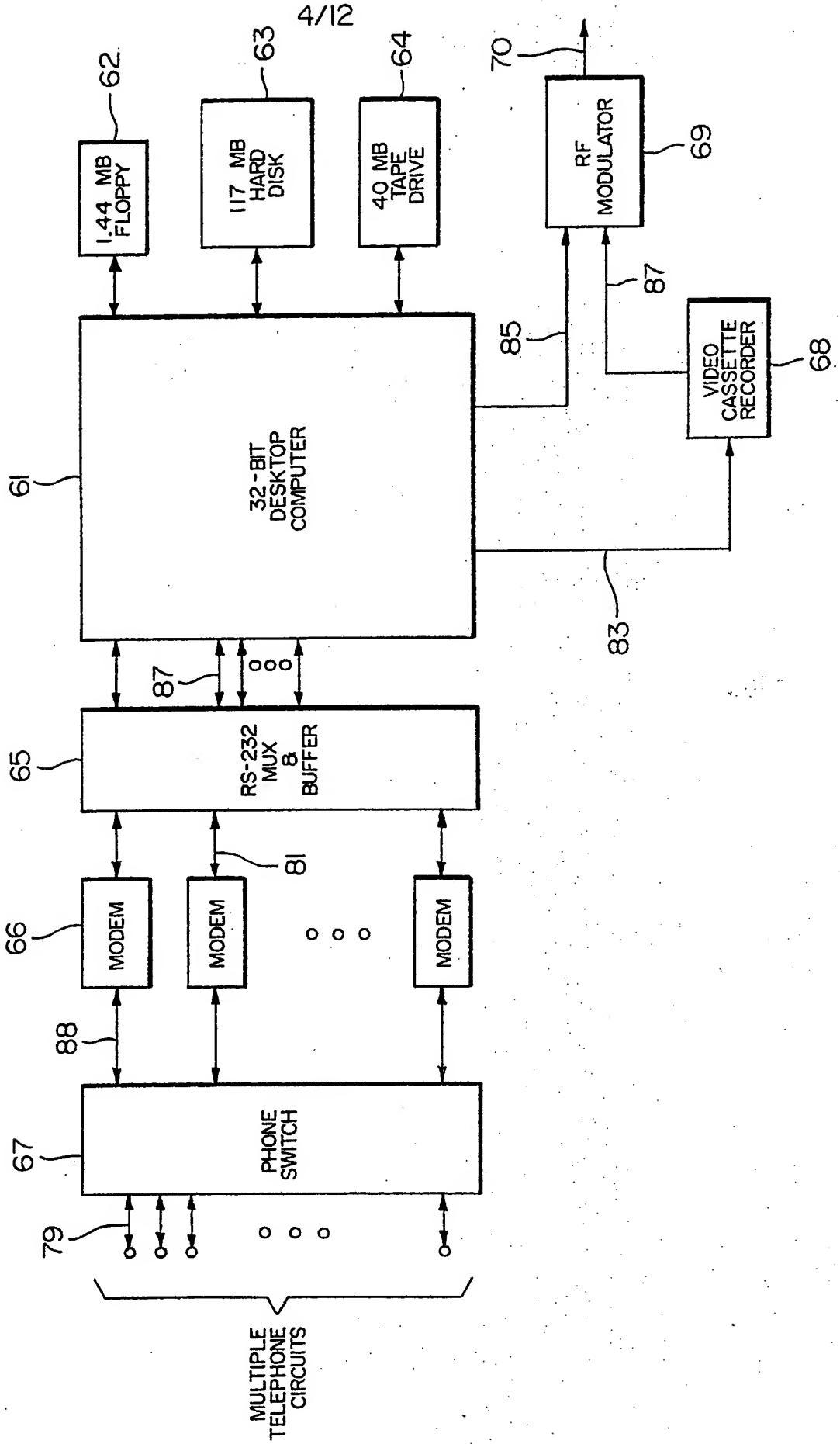
62
1.44 MB FLOPPY
63
117 MB HARD DISK
64
40 MB TAPE DRIVE
70
RF MODULATOR
69
87
85
VIDEO CASSETTE RECORDER
68
61
32-BIT DESKTOP COMPUTER
83
87
65
RS-232 MUX & BUFFER
81
66
MODEM
MODEM
MODEM
88
67
PHONE SWITCH
79
MULTIPLE TELEPHONE CIRCUITS

FIG. 4

FIG. 5

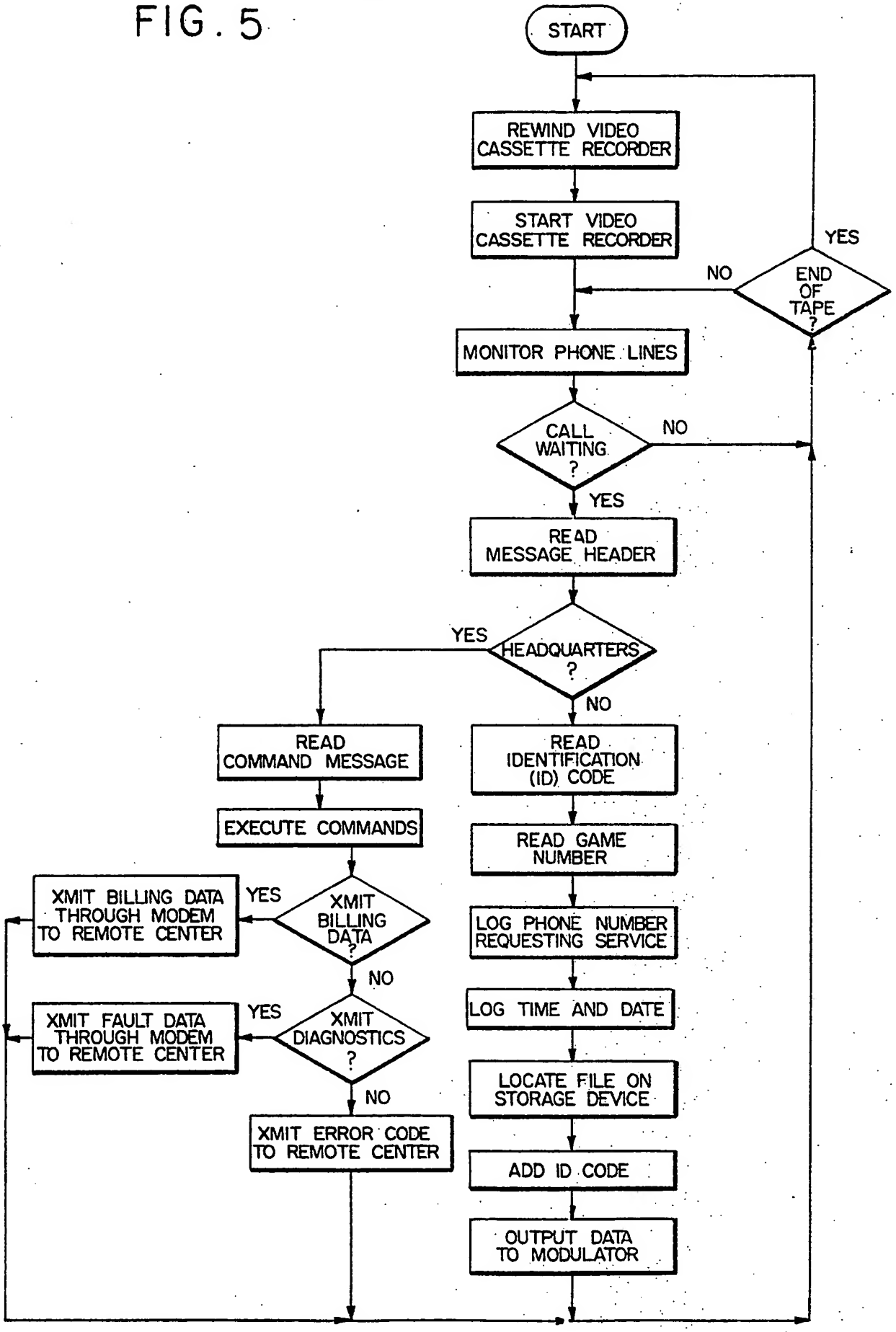
START
REWIND VIDEO CASSETTE RECORDER
START VIDEO CASSETTE RECORDER
END OF TAPE ?
YES
NO
MONITOR PHONE LINES
CALL WAITING ?
NO
YES
READ MESSAGE HEADER
HEADQUARTERS ?
YES
NO
READ COMMAND MESSAGE
EXECUTE COMMANDS
XMIT BILLING DATA ?
YES
XMIT BILLING DATA THROUGH MODEM TO REMOTE CENTER
NO
XMIT DIAGNOSTICS ?
YES
XMIT FAULT DATA THROUGH MODEM TO REMOTE CENTER
NO
XMIT ERROR CODE TO REMOTE CENTER
READ IDENTIFICATION (ID) CODE
READ GAME NUMBER
LOG PHONE NUMBER REQUESTING SERVICE
LOG TIME AND DATE
LOCATE FILE ON STORAGE DEVICE
ADD ID CODE
OUTPUT DATA TO MODULATOR

FIG. 6

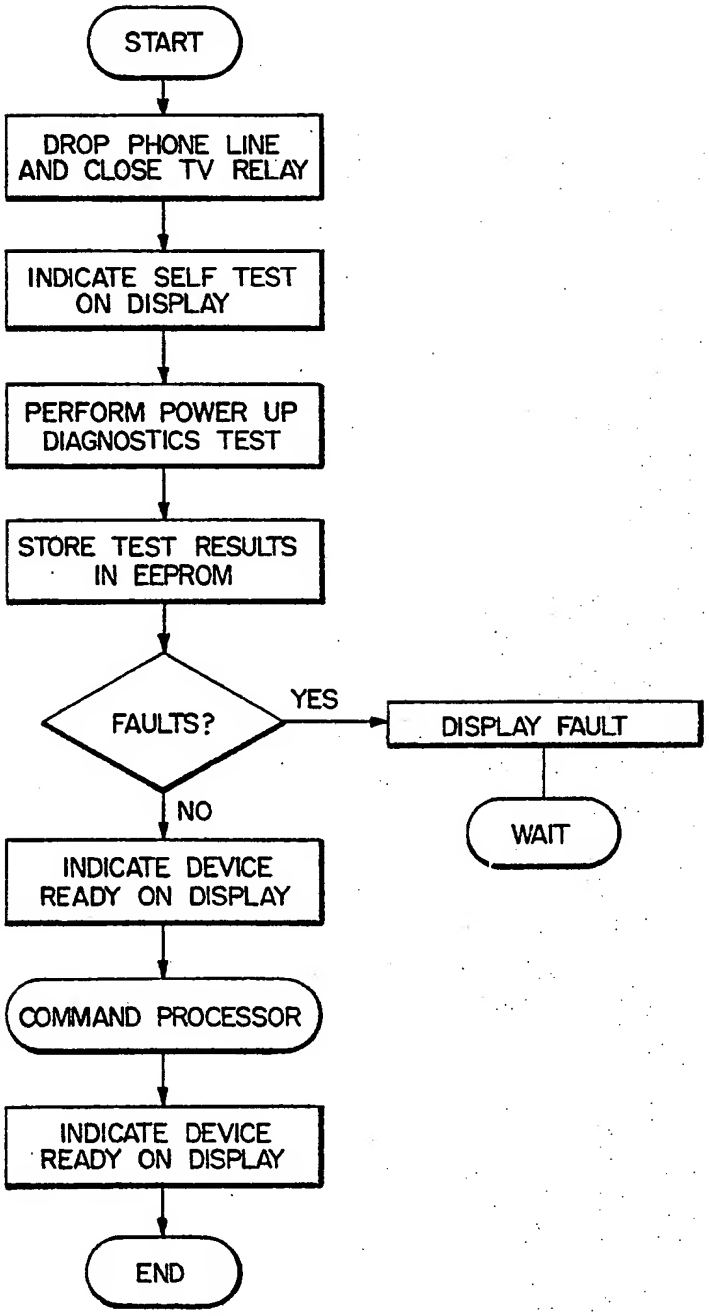
START
DROP PHONE LINE AND CLOSE TV RELAY
INDICATE SELF TEST ON DISPLAY
PERFORM POWER UP DIAGNOSTICS TEST
STORE TEST RESULTS IN EEPROM
FAULTS?
YES
DISPLAY FAULT
WAIT
NO
INDICATE DEVICE READY ON DISPLAY
COMMAND PROCESSOR
INDICATE DEVICE READY ON DISPLAY
END

FIG.7

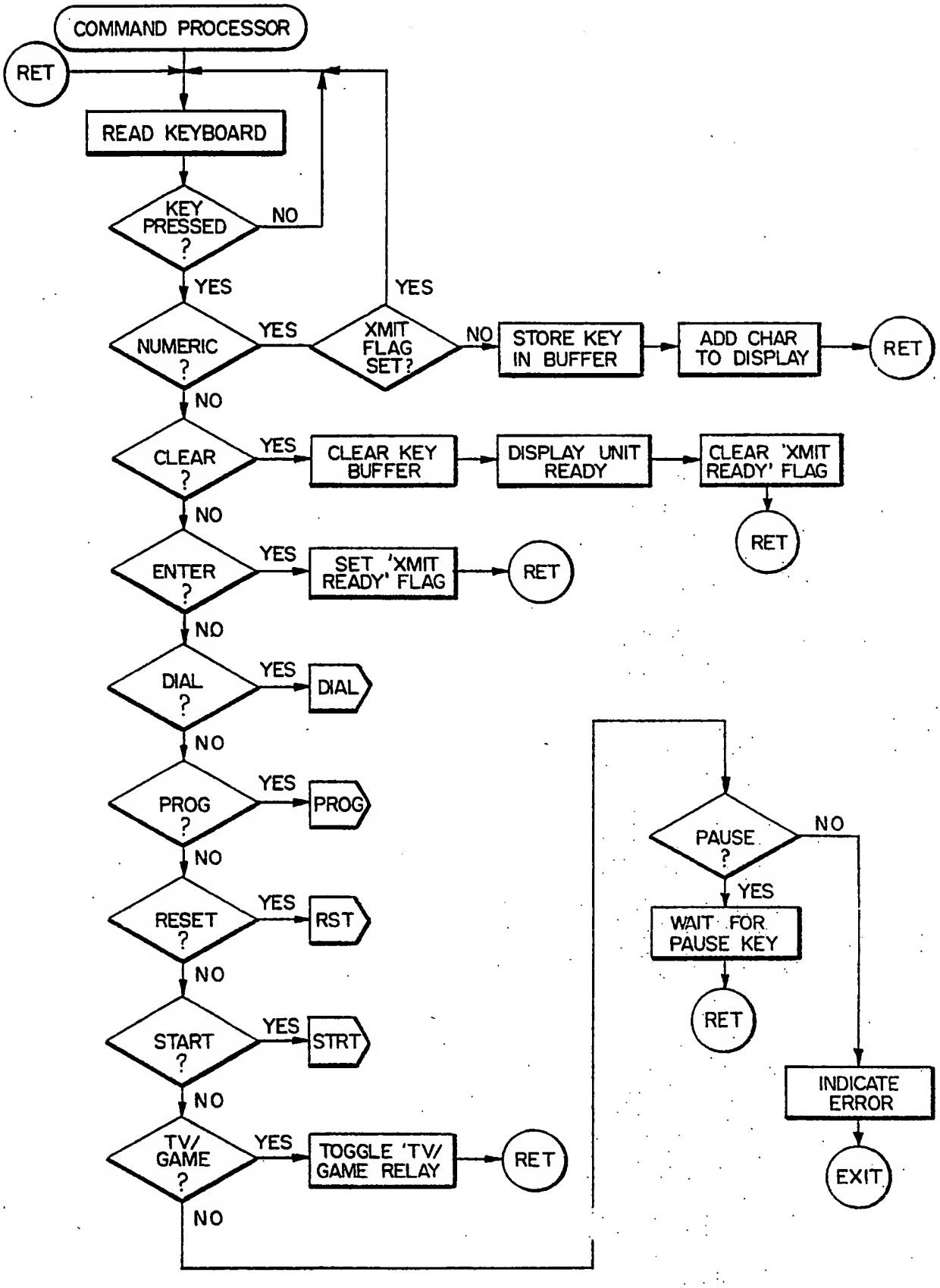
COMMAND PROCESSOR
RET
READ KEYBOARD
KEY PRESSED ?
NO
YES
NUMERIC ?
YES
XMIT FLAG SET?
YES
NO
STORE KEY IN BUFFER
ADD CHAR TO DISPLAY
RET
NO
CLEAR ?
YES
CLEAR KEY BUFFER
DISPLAY UNIT READY
CLEAR 'XMIT READY' FLAG
RET
NO
ENTER ?
YES
SET 'XMIT READY' FLAG
RET
NO
DIAL ?
YES
DIAL
NO
PROG ?
YES
PROG
NO
RESET ?
YES
RST
NO
START ?
YES
STRT
NO
TV/ GAME ?
YES
TOGGLE 'TV/ GAME RELAY
RET
NO
PAUSE ?
NO
YES
WAIT FOR PAUSE KEY
RET
INDICATE ERROR
EXIT

FIG. 8

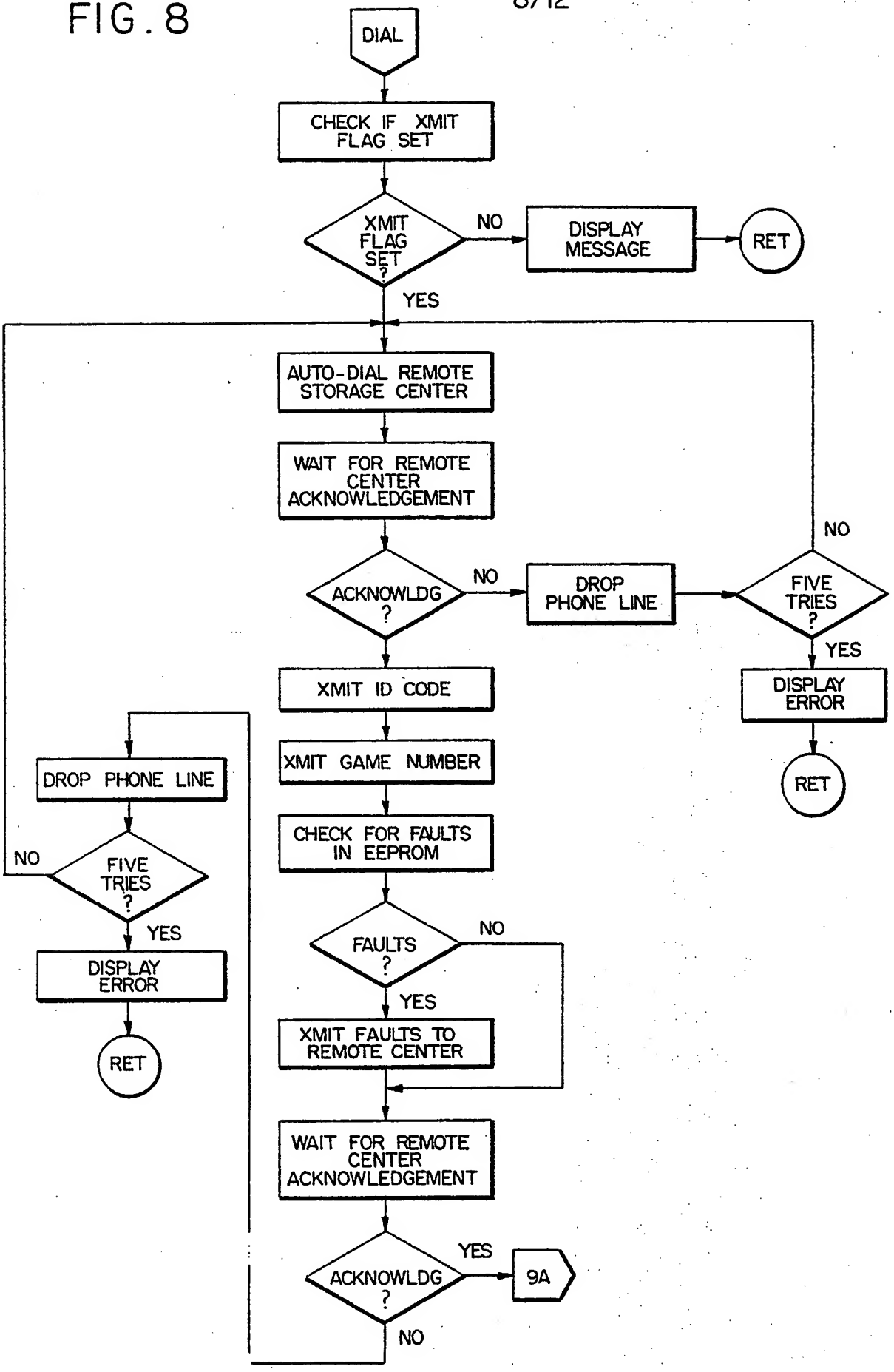
DIAL
CHECK IF XMIT FLAG SET
XMIT FLAG SET ?
NO
DISPLAY MESSAGE
RET
YES
AUTO-DIAL REMOTE STORAGE CENTER
WAIT FOR REMOTE CENTER ACKNOWLEDGEMENT
ACKNOWLDG ?
NO
DROP PHONE LINE
FIVE TRIES ?
NO
YES
DISPLAY ERROR
RET
XMIT ID CODE
XMIT GAME NUMBER
CHECK FOR FAULTS IN EEPROM
FAULTS ?
NO
YES
XMIT FAULTS TO REMOTE CENTER
WAIT FOR REMOTE CENTER ACKNOWLEDGEMENT
ACKNOWLDG ?
YES
9A
NO
DROP PHONE LINE
FIVE TRIES ?
NO
YES
DISPLAY ERROR
RET

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FIG. 9

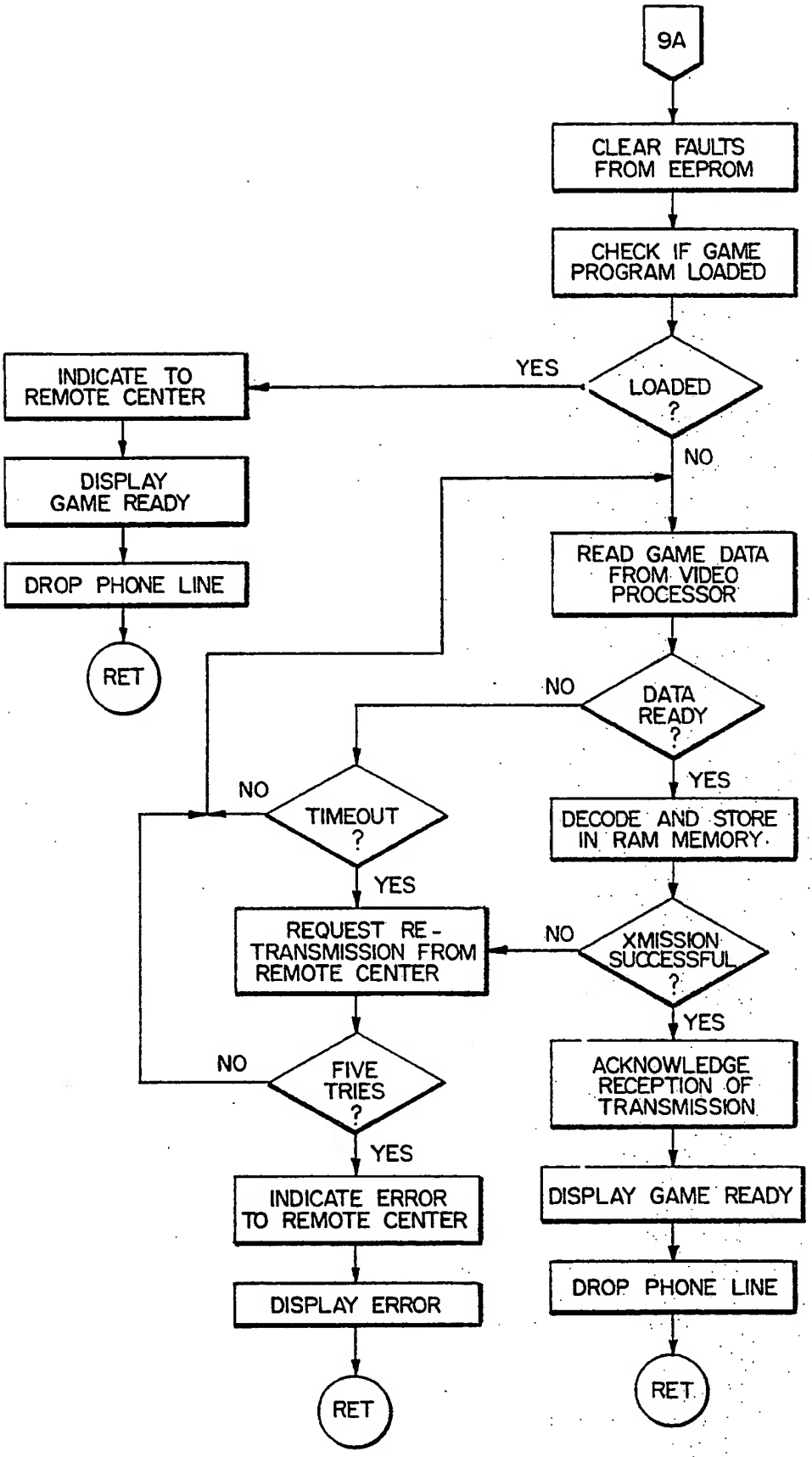


FIG. 10

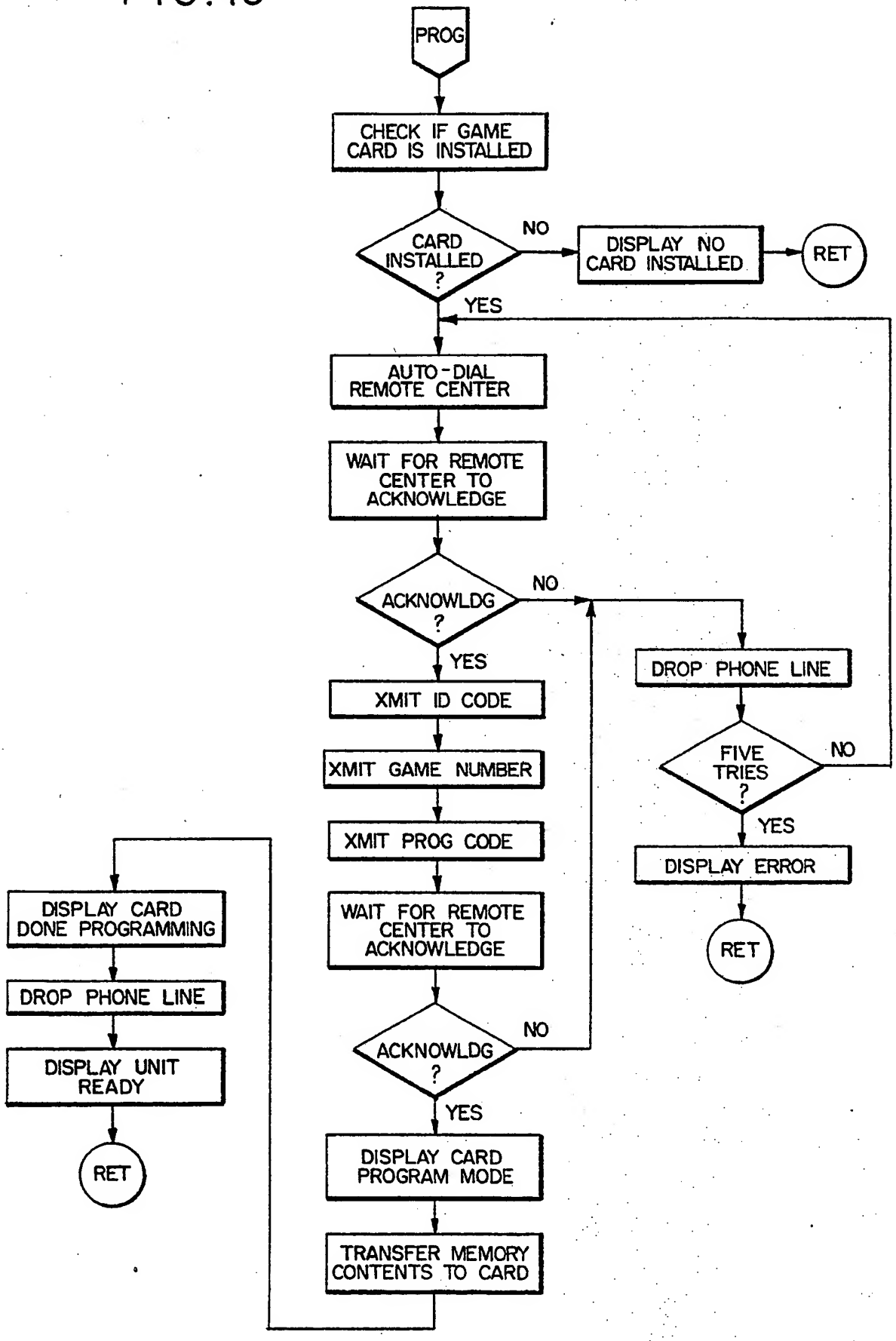

PROG
CHECK IF GAME CARD IS INSTALLED
CARD INSTALLED ?
NO
DISPLAY NO CARD INSTALLED
RET
YES
AUTO-DIAL REMOTE CENTER
WAIT FOR REMOTE CENTER TO ACKNOWLEDGE
ACKNOWLDG ?
NO
YES
XMIT ID CODE
XMIT GAME NUMBER
XMIT PROG CODE
WAIT FOR REMOTE CENTER TO ACKNOWLEDGE
ACKNOWLDG ?
NO
YES
DISPLAY CARD PROGRAM MODE
TRANSFER MEMORY CONTENTS TO CARD
DROP PHONE LINE
FIVE TRIES ?
NO
YES
DISPLAY ERROR
RET
DISPLAY CARD DONE PROGRAMMING
DROP PHONE LINE
DISPLAY UNIT READY
RET

FIG. 11

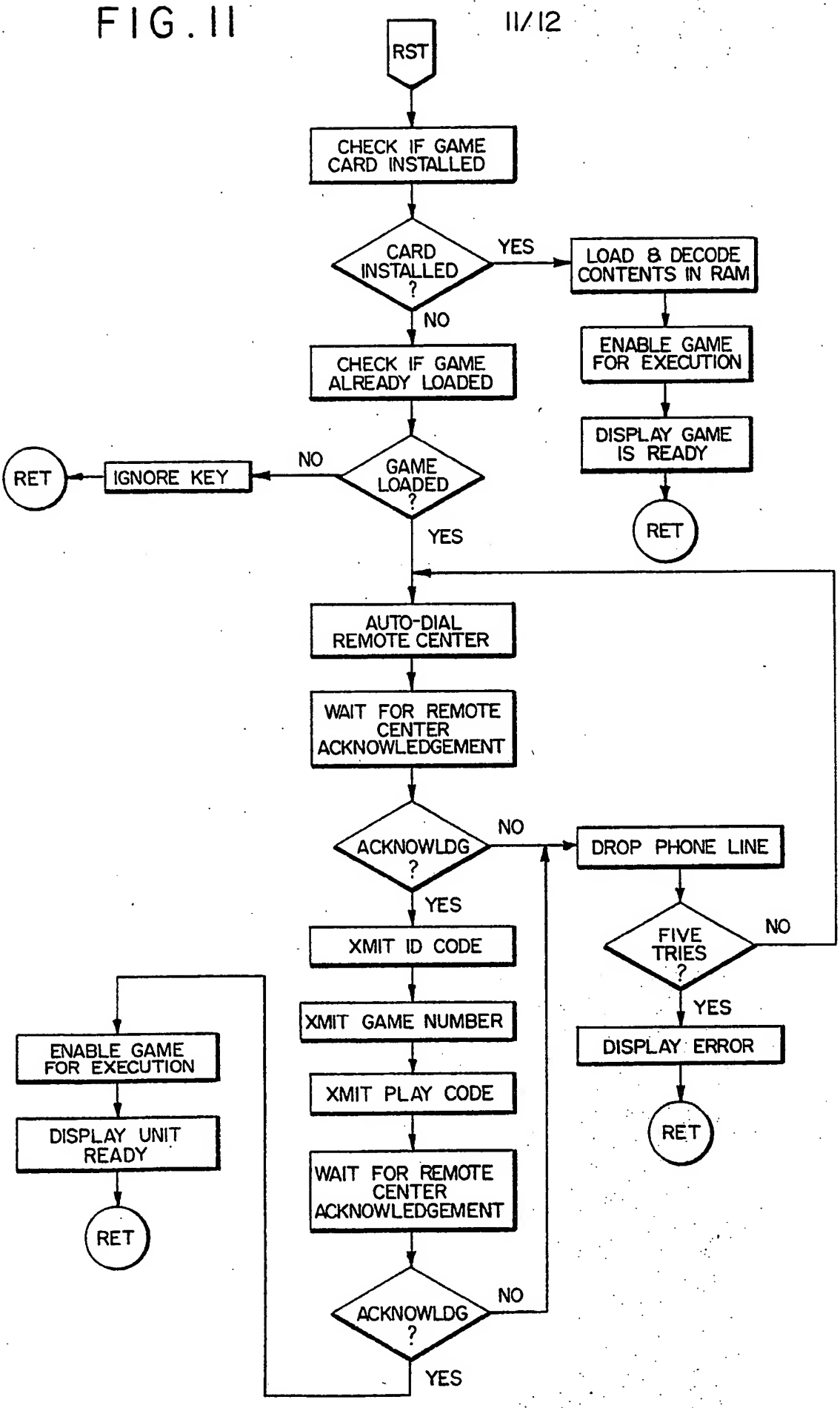
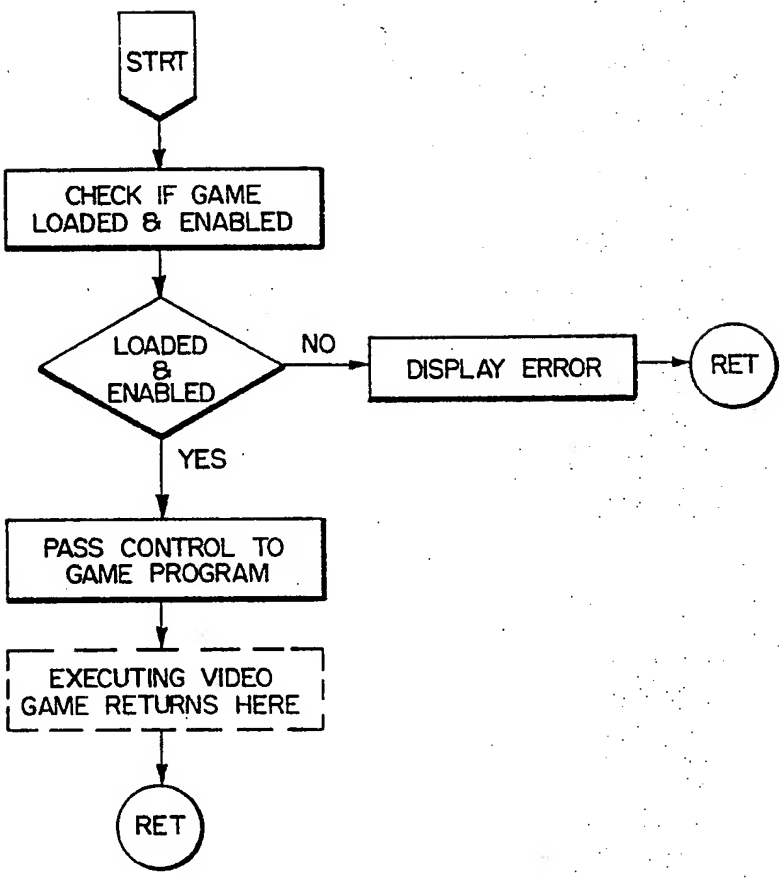

RST
CHECK IF GAME CARD INSTALLED
CARD INSTALLED ?
YES
LOAD & DECODE CONTENTS IN RAM
ENABLE GAME FOR EXECUTION
DISPLAY GAME IS READY
RET
NO
CHECK IF GAME ALREADY LOADED
GAME LOADED ?
NO
IGNORE KEY
RET
YES
AUTO-DIAL REMOTE CENTER
WAIT FOR REMOTE CENTER ACKNOWLEDGEMENT
ACKNOWLDG ?
NO
DROP PHONE LINE
FIVE TRIES ?
NO
YES
DISPLAY ERROR
RET
YES
XMIT ID CODE
XMIT GAME NUMBER
XMIT PLAY CODE
WAIT FOR REMOTE CENTER ACKNOWLEDGEMENT
ACKNOWLDG ?
NO
YES
ENABLE GAME FOR EXECUTION
DISPLAY UNIT READY
RET

FIG. 12


STRT
CHECK IF GAME LOADED & ENABLED
LOADED & ENABLED
NO
DISPLAY ERROR
RET
YES
PASS CONTROL TO GAME PROGRAM
EXECUTING VIDEO GAME RETURNS HERE
RET

INTERNATIONAL SEARCH REPORT

International Application No PCT/US90/05850

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC (5): H04H 1/02; H04N 7/10
U.S.CL.: 455/3, 4, 5; 358/86

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
U.S.	455/ 3, 4, 5, 358/ 84, 86, 114

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
Y	US, A, 4,506,387 (WALTER) 19 March 1985 See entire document	1-8
Y	US, A, 4,623,920 (DUFRESNE ET AL) 18 November 1986 See entire document	1-8
Y	US, A, 4,866,515 (TAGAWA ET AL) 12 September 1989 See entire document	1-8
Y,P	US, A, 4,890,320 (MONSLOW ET AL) 26 December 1989 See entire document.	8
Y	US, A, 4,677,685 (KURISU) 30 June 1987 See figure 1	3

* Special categories of cited documents: [15]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
09 JANUARY 1990	20 FEB 1991
International Searching Authority [1]	Signature of Authorized Officer [20]
ISA/US	NGUYEN NGOC-HO INTERNATIONAL DIVISION For LISA D. CHAROUEL Ngoc Ho Nguyen

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

Y	US, A, 4,580,161 (PETRUS ET AL) 01 April 1986 See entire document	7

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [1]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers . because they relate to subject matter [1] not required to be searched by this Authority, namely:

2. ☐ Claim numbers..... , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [1], specifically:

3. ☐ Claim numbers_____, because they are dependent claims not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [2]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.